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## The Future Space Program

In support of the Administration's recommendations on the future of the space effort, panels of the President's Science Advisory Committee have prepared a report, entitled "The Space Program in the Post-Apollo Period."\* This document seems designed to provide an intellectual justification for a continuing program likely to cost more than \$50 billion. In view of the issues involved, one might hope for a comprehensive report delineating and weighing alternatives; the actual product is thin, and it advocates oftener than it weighs.

Major matters that need to be discussed are: What are the major scientific challenges? What is the importance of these questions as compared with those which can be studied on earth? What are the chances of discovering extraterrestrial life? What are the arguments for manned versus unmanned exploration of space?

In outlining objectives for the post-Apollo period, the report slights near-earth activities that are likely to pay off well both scientifically and practically. The principal questions set forth are these:

1. Does life abide in places other than the earth, and if so what is its nature, how did it evolve and what are its probable forms elsewhere?
2. What is the origin and evolution of the universe, and what is its ultimate destiny? What is the place of our sun and solar system in it? Do natural laws as we know them on earth indeed govern the behavior of every observable part of the vastness of space?
3. What are the physical conditions on the moon and on the other planets in our system, and how did our solar system evolve? What dynamic relationships between the sun and the planets shape their environments?

These are grand questions, but it was not made evident that the post-Apollo program has much chance of answering more than a few of them. The best prospect for fundamental, scientific findings is a program employing astronomical observatories in orbit.

The report is less than complete in its discussion of the comparative value of space and nonspace activities: "space programs can be thought of as competitive with other quite different programs, for example, in oceanography, improved transportation, or in urban renewal." However, the difficult problem of priorities was quickly ducked: "Comparisons among the different programs go well beyond the competence of the Panels."

A substantial fraction of the expensive post-Apollo program is to be devoted to a search for extraterrestrial life. However, only a few sentences in the report mention the search. Nowhere is there an evaluation of the chances of finding life on Mars or Venus.

Another deficiency is the lack of a full discussion of the role of man in deep space exploration. To date, manned missions have contributed little scientifically. The unmanned missions have had a cost effectiveness for scientific achievement perhaps 100 times that of the manned flights. Nevertheless, the report implicitly calls for a major role for man in the post-Apollo program.

The advocates of a large continuing space program have made their report. A committee of nonspace scientists would recommend differently. However, they are not likely to be asked to do so.—PHILIP H. ABELSON

\* "The Space Program in the Post-Apollo Period," may be obtained for 50 cents from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.